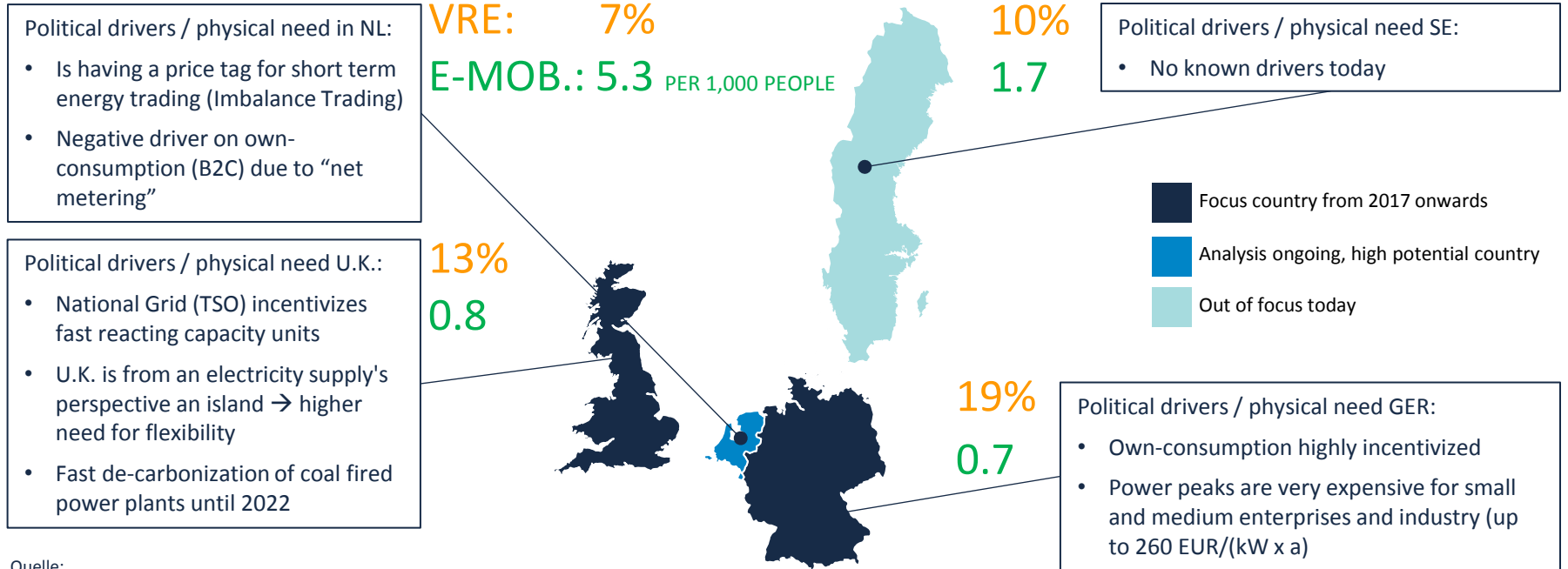


# BATTERY@WIND

## Vattenfall's Business Case for Batteries

26. Spreewind Windenergietage, 08.11.2017, Sebastian Gerhard

# THE CHALLENGES IN THE NEW ENERGY WORLD



Quelle:

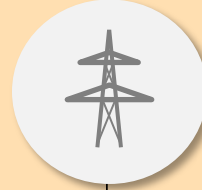
VRE from „Short Assessment of Renewable Energy Sources 2015“, European Commission

E-Mob. from smava, 2016

# THE SOLUTION: BATTERY@WIND



## Battery@Wind Applications



### Applications behind the meter

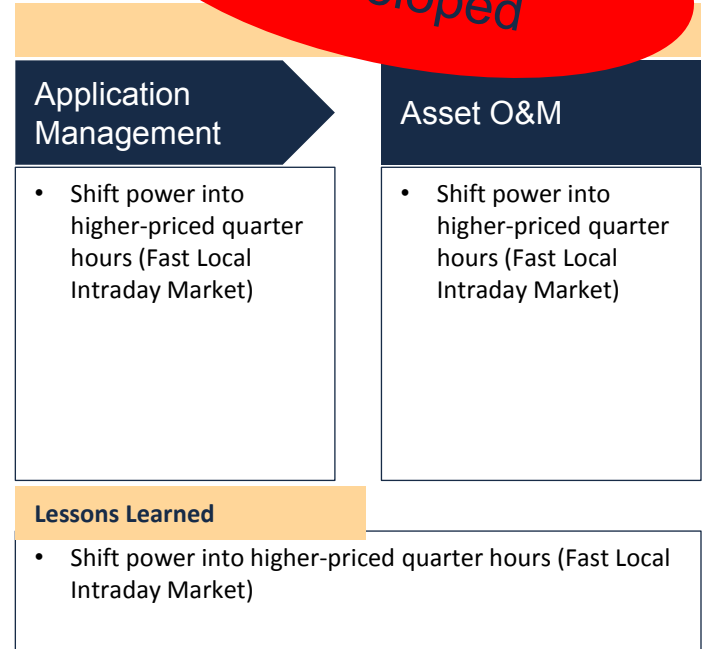
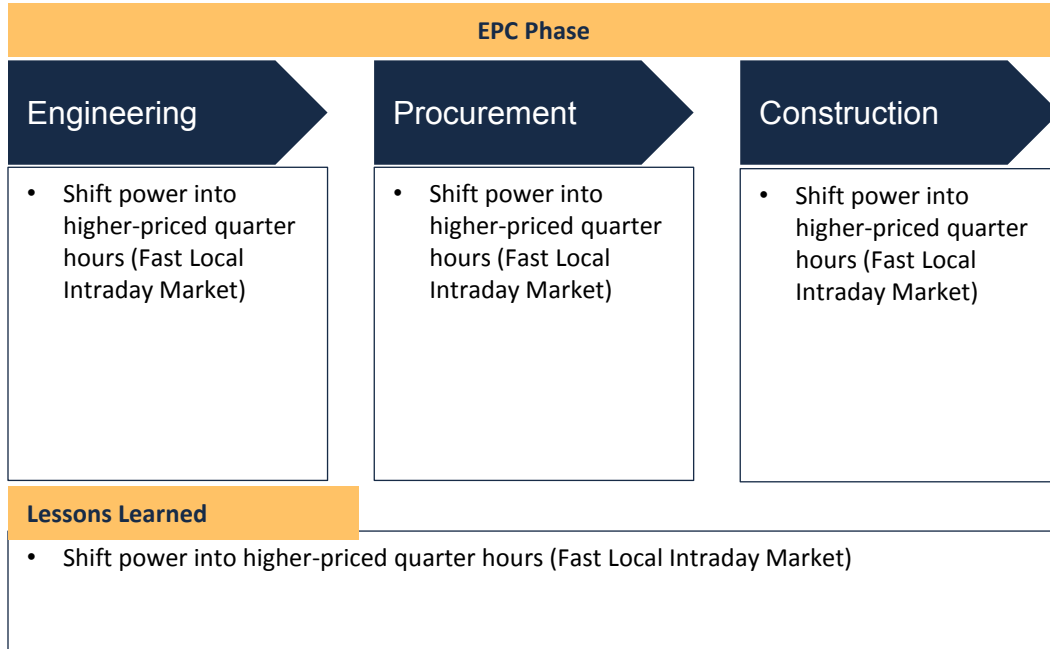
1. Control upward / downward ramps
2. Avoid curtailment
3. Reduce wind turbine inverter capacity
4. Avoid energy consumption from grid
5. Reduce forecast error from power schedule submitted day-ahead (Imbalance payments)
6. Shift power into higher-priced quarter hours (Fast Local Intraday Market)

### Applications in transmission/ distribution grid

7. Deliver virtual inertia
8. Deliver primary / secondary / tertiary frequency reserve
9. Stabilize voltage with reactive power
10. Balance flicker
11. Defer / supersede traditional T&D investments
12. Contribute to black start capability
13. Shift peak production

# VATTENFALL'S VALUE CHAIN

*To be developed*





## Contact

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